October 1987 $5.00

Bulk Plants Hit With OSHA Benzene Regs
Emerging Trends in Gasoline Composition
How King Oil Competes in Kansas City

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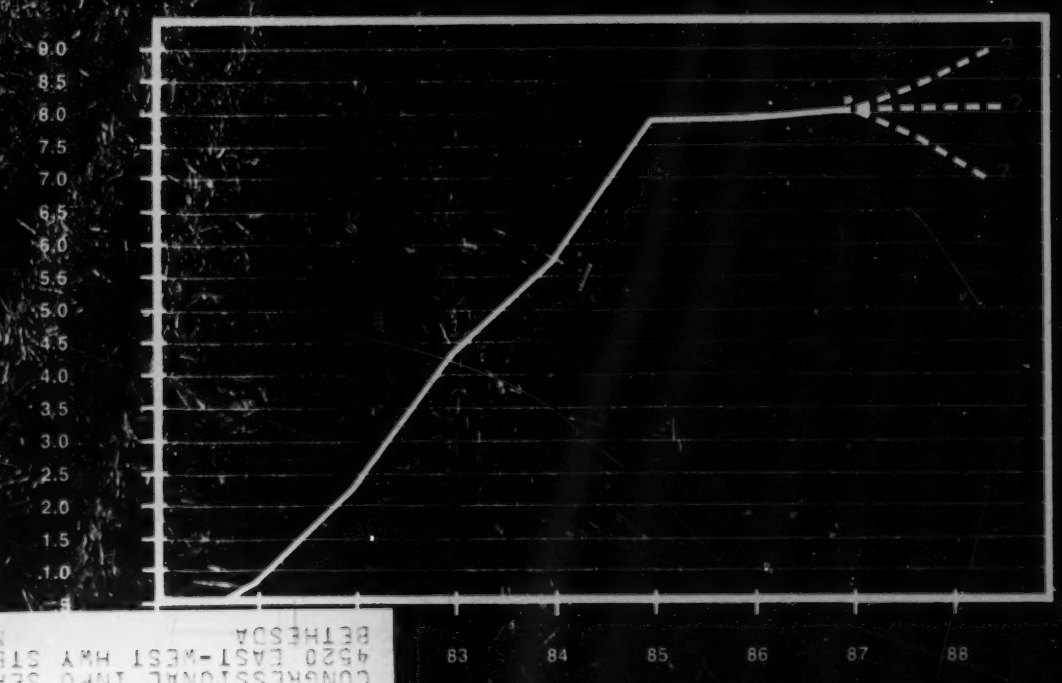
NPN

National Petroleum News

Alcohol Fuels Face Uncertain Future



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Looking Things Over

Beginning this month, Frank Victoria becomes *NPN*'s Editor-in-Chief. I am stepping aside to pursue other things, including professional loafing. I will, from time to time, continue to make occasional contributions to *NPN* but Frank will in the future come to you each month on this page.

Frank has a good background to take over the future direction of *NPN*. He is an ex-editor of Service Station Management, a sister publication of *NPN* in the Hunter Publishing Co. stable. In addition, he has served as *NPN*'s Managing Editor for the past several months, preparing him for his new assignment.

Frank finds the petroleum marketing industry a complex but exciting field for a professional journalist to cover. As the 78-year-old magazine's sixth Editor, Frank hopes to continue its enviable reputation of being "the oil marketer's bible" by serving marketer readers with factual and interpretative information each month about significant trends and developments in their industry.

The industry that *NPN* will be covering in the future under Frank's direction should be an exciting one.

It has, since all the upheaval and change of the 1970s, become a much smaller but far more efficient industry. The old "incremental barrel" theory of running refineries and everything else wide open has given way to a new era of oil companies trying to tailor refinery production to market demand. Marketers, meanwhile, are concentrating on fewer but higher-volume units and searching for more and more "tie-ins."

Some marketers say they miss all the excitement of the wild and wooly days of the pre-1970s, and add that the industry isn't as much "fun" as it once was. Others say it is a more exhilarating industry than ever. It is a more risky business nowadays but the profit opportunities might be better, too.

Whatever trends the industry takes, Frank and his crew will be reporting and interpreting them for you.

—Marvin Reid

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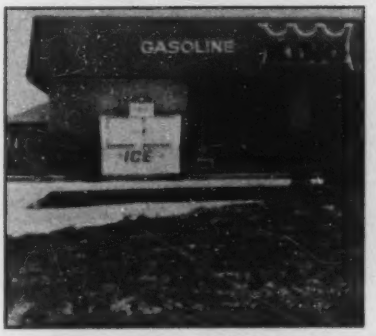
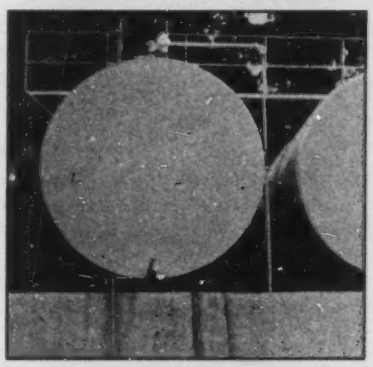
Good old-fashioned "gasohol" is caught up in a contentious struggle in the motor fuel marketplaces to gain more market share. But industry sources and government can't agree on its benefits, market volume or future. **Page 38**



King Oil Co. has carved out a healthy niche in the tough Kansas City market. Their strategy: Build and operate convenience stores that sell gasoline, not vice versa. **Page 52**



Petroleum retailers may be exempt from OSHA's new benzene regs, but bulk plant operators could face major expenses if required to install vapor recovery equipment. **Page 56**

• TRENDS

Cross Your Fingers: Fall Could Be Tricky

Some red flags had already been flapping a warning about crude oil and gasoline prices long before the Labor Day weekend came and went. Now, there is even more reason to wonder whether the last quarter of this year may turn out to be somewhat more troublesome than had originally been anticipated in earlier forecasts.

For example, the initial overall scenario began to show signs of falling apart in August after the slow but steady growth upwards from last year's disastrous collapse of crude oil and product prices. In fact, the short term outlook was for the most part expected to be rather bland. However, the late summer harbingers could not accurately be described as fully supportive of this unexciting outlook.

Wholesale prices for unleaded gasoline (for all types and services) eroded by almost 5¢ a gal. between the beginning and the end of August. Retail prices were down about 1.5¢ a gal. at the same time. Consumption, which should have been higher, inasmuch as August is a peak driving month, stayed at about the same level as it had been in June and July. In other words, no gain. Gasoline imports boomed along at the 550,000-to-600,000 b/d level while stocks remained on the high side—at 228-million bbl., about 14-million to 15-million bbl. higher than last year.

Wholesale gasoline prices at the end of August were just a shade under 55¢ a gal. Pump prices for unleaded—again the all-grades, all-services averages—dropped to 98¢ a gal. This was not a helpful figure when it is recalled that gasoline prices had been expected to top the $1 a gal. mark in the third quarter of this year and drop 1¢ to 99¢ a gal. in the fourth quarter. With July averages of 99¢ and August of 98¢, September would have to exceed $1.03 gal. to make the prediction of $1 a gal. come true for the third quarter. But there's not much chance that could happen—barring, of course, any unforeseen disruptions created by Persian Gulf entanglements.

That would put a small damper on the fourth quarter forecast of 99¢ a gal. and perhaps carry over into the first quarter of 1988, which was also scheduled to look like 99¢ a gal. The fall and early winter weather undoubtedly will flatten out the summer's driving boom, as is traditional. More new cars with higher engine efficiency and more smaller cars with reduced gasoline appetites also will have their continuing impact on the shrinking need for gasolines.

Another critical factor is what the OPEC exporters do in the third and fourth quarters of this year. For a while, it seemed as though the OPEC countries might make good on their pledges to hold the line on production. But despite all their agreements and meetings, production averaged about 1-million to 1.5-million b/d over first half quotas. Fears were expressed that the same thing may happen in the second half as Iraq, the United Arab Emirates and the Neutral Zone ignore their assigned quotas and produce more than is needed.

What all this means is that there will be excesses of 1.5-million to perhaps 2-million b/d of crude floating around looking for a home. That won't help matters domestically—especially on the East Coast where there are a number of brokers and entrepreneurs eagerly looking for bargains they can bring into the United States.

These factors prompted the federal government to raise one of the various red flags in late summer with this comment: "Very recent data on imports suggest that the United States is importing more oil than necessary to meet expected demand. If this is true, there may be excess stocks on hand in the fall, leading to generally weak prices."

It's going to be an interesting period for marketers that merits a watchful eye at all times. And if the situation in the Persian Gulf blows up, we'll be in an entirely new ball game. —*J. Richard Shaner*

• MARKETPLACE AT A GLANCE

AVERAGE GASOLINE PRICES IN THE U.S. (per gal.)

JULY	Gasoline (All Types)	Leaded Regular	Unleaded Regular	Unleaded Premium
U.S. City Avg.	$0.980	$0.921	$0.971	$1.115
Regions:				
Northeast	1.004	0.931	0.976	1.125
North Central	0.992	0.950	0.991	1.128
South	0.976	0.905	0.966	1.109
West	0.956	0.906	0.954	1.097

Source: U.S. Dept. of Labor, Bureau of Labor Statistics.

STOCKS (Add 000 bbl.)

	8/28/87	8/29/86
Gasoline (total)	226,536	216,322
Gasoline (Unleaded)*	135,227	112,552
Jet Kerosine	41,329	42,631
Distillates	123,538	130,128
Residual	43,437	41,244

**Included in gasoline total.*

Source: American Petroleum Institute.

NPN

NATIONAL PETROLEUM NEWS OCTOBER 1987

Gasoline Prices, Consumption Moving Up—But Only Modestly

Persian Gulf developments are causing erratic fluctuations in international and domestic crude oil activities but no significant changes in domestic supplies and prices are anticipated by the federal government.

The latest short-term energy forecast indicates anew that gasoline demand will average about 2% to 3% higher this year than last but will be relatively flat in 1988 [*NPN*—Aug.'87, p27]. Prices which hit the $1 a gal. level in the third quarter will average only 96¢ a gal. for the year. Next summer's average prices will be $1.03 to $1.04 a gal., with the year's average to be $1.02, according to government analysts.

About the best that can be said is that the era of cheap gasoline (i.e., product at less than $1 a gal.) apparently is over. Much depends on the volume of imports in the second half, however. Said the government: "Very recent data suggest that the United States is importing more oil than necessary to meet expected de-

(Continued on Page 30)

Consumer Survey Shows Resistance To Alcohol Fuels

A summer survey commissioned by Amoco indicates that American motorists have serious reservations about alcohol fuels as well as the federal and state subsidies to support such fuels.

Amoco also reported that it sent a detailed reply to a letter from Senator James McClure (R-Idaho), which implied that Amoco used negative campaigns against alcohol fuels.

The survey was conducted in June by National Family Opinion Research, Inc., and involved 5,500 questionnaires to motorists in approximately half of the states in the nation. (See related stories on Page 38).

The motorists were asked if gasohol should be subsidized. Nationally, roughly eight out of 10 respondents (78%) said "No." Only 18% said "Yes," according to the survey.

The negatives were even stronger in response to two additional questions about the federal government mandating use of alcohol fuels.

A total of 84% disapproved of a suggestion that at least one-half of the gasoline sold should be gasohol; and 92% rejected the idea that all motor fuel should be a gasohol blend.

According to the Amoco survey, many motorists who had used gasohol said they backed off because of engine harm or poor engine performance. In some states, 60% of the motorists gave this negative response. Minnesota was highest with 70%.

The Amoco survey report listed 14 states and seven major cities. Most were in its normal marketing area, including states that offered tax subsidies for gasohol. Amoco marketed gasohol in many of the states authorizing subsidies.

The states were California, Colorado, Florida, Illinois, Iowa, Kansas, Louisiana, Michigan, Minnesota, Nebraska, New Hampshire, New Jersey, North Dakota and South Dakota. Neither New Jersey nor New Hampshire have reported gasohol consumption in recent years but Amoco said these states were included for balancing purposes. Metropolises included were Chicago, Detroit, Los Angeles, Minneapolis, New York, St. Louis and Wichita/Topeka.

Among the big gasohol states not surveyed were Ohio, Kentucky, Indiana and Virginia which, along with Illinois, were the top five consumers in 1986.

Amoco said the national compilation indicated that more than 80% motorists were aware of alcohol fuels, 20% have tried it but only 4% were still using it. Of those polled in North Dakota, Iowa and Nebraska—basically agrarian states—more than half said they had tried gasohol and roughly 25% said they were still using it. On the other end of the spectrum, California, Colorado, Florida and Michigan were listed on the low side with only 6% or less of the motorists polled saying they were still using it.

Amoco released copies of an exchange of letters between Sen. James McClure (R-Ida.) and Amoco president L.D. Thomas, in which the Senator accused the oil company of "negative campaigns against alcohol fuels."

Thomas wrote: "We are not against the use of any alternative fuel if it meets the tests of economic viability, environmental compatibility and consumer acceptance. What disturbs us are moves toward government mandates of one or more particular alternative fuels which do not, in our

(Continued on Page 32)

Motorist Aversion to Alcohol Fuels

	No	Yes
Should gasohol be subsidized?	78%	18%
Should government require that one-half of all gasoline sold be gasohol?	84%	11%
Should government require all gasoline sold be gasohol?	92%	3%

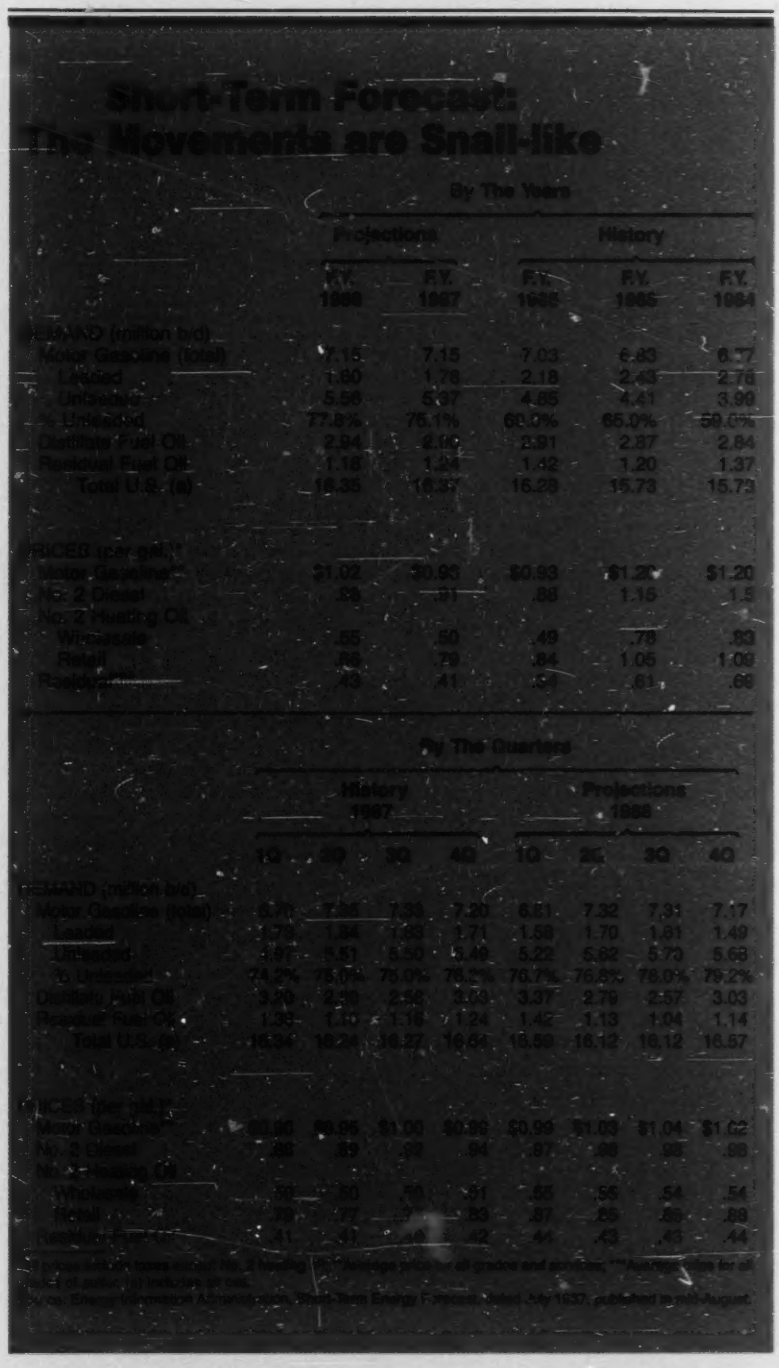
	Aware of Gasohol	Have Used	Still Using
California	80%	15%	4%
Colorado	95%	29%	4%
Florida	87%	31%	3%
Illinois	91%	36%	14%
Iowa	98%	62%	25%
Kansas	93%	50%	13%
Louisiana	94%	51%	13%
Michigan	91%	38%	6%
Minnesota	95%	41%	11%
Nebraska	97%	56%	23%
New Hampshire	88%	1%	1%
New Jersey	84%	7%	0.5%
North Dakota	92%	53%	26%
South Dakota	97%	47%	14%

Gasoline Prices, Continued . . .

mand. . . If this is true, there may be excess stocks on hand this fall, leading to generally weak prices."

Distillate heating oil prices will be up materially over last winter—say 10¢ to 12¢ a gal. higher, on the average. However, for the year as a whole, they're likely to be under 1986's average of 84¢ gal.

Domestic crude oil production is still tabbed at a minus 400,000 b/d for this year and another 200,000 b/d next. International crude prices, despite the fluctuations, are not expected to average more than $19 bbl. in 1988. Net imports, which averaged 5.44-million b/d in 1986, are expected to be around 5.65-million b/d in 1987 and 5.96-million b/d in 1988.



Short-Term Forecast:
The Movements are Snail-like

By The Years

	Projections		History		
	F.Y. 1988	F.Y. 1987	F.Y. 1986	F.Y. 1985	F.Y. 1984
DEMAND (million b/d)					
Motor Gasoline (total)	7.15	7.15	7.03	6.83	6.77
Leaded	1.80	1.78	2.18	2.43	2.78
Unleaded	5.56	5.37	4.85	4.41	3.99
% Unleaded	77.8%	75.1%	69.0%	65.0%	59.0%
Distillate Fuel Oil	2.84	2.82	2.91	2.87	2.84
Residual Fuel Oil	1.18	1.24	1.42	1.20	1.37
Total U.S. (a)	16.35	16.37	16.28	15.73	15.73
PRICES (cents/gal.)					
Motor Gasoline**	$1.02	$0.93	$0.93	$1.20	$1.20
No. 2 Diesel	.93	.91	.88	1.15	1.15
No. 2 Heating Oil					
Wholesale	.55	.50	.49	.78	.83
Retail	.93	.79	.84	1.05	1.09
Residual	.43	.41	.34	.61	.66

By The Quarters

	History 1987				Projections 1988			
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
DEMAND (million b/d)								
Motor Gasoline (total)	6.91	7.05	7.33	7.20	6.81	7.32	7.31	7.17
Leaded	1.79	1.84	1.81	1.71	1.58	1.70	1.81	1.49
Unleaded	5.12	5.21	5.52	5.49	5.22	5.62	5.70	5.68
% Unleaded	74.2%	74.0%	75.0%	76.2%	76.7%	76.8%	78.0%	79.2%
Distillate Fuel Oil	3.00	2.90	2.56	3.03	3.37	2.78	2.57	3.03
Residual Fuel Oil	1.33	1.10	1.18	1.24	1.42	1.13	1.04	1.14
Total U.S. (a)	16.34	16.24	16.27	16.64	16.59	16.12	16.12	16.57
PRICES (per gal.)								
Motor Gasoline**	$0.90	$0.95	$1.00	$0.96	$0.99	$1.03	$1.04	$1.02
No. 2 Diesel	.88	.89	.97	.94	.97	.98	.98	.88
No. 2 Heating Oil								
Wholesale	.50	.50	.59	.51	.55	.56	.54	.54
Retail	.79	.77	.87	.83	.87	.85	.89	.89
Residual	.41	.41	.47	.42	.44	.43	.43	.44

Buyout Increases Petromark Reserves

Petromark Resources Co., Tulsa, Okla., will increase its proven reserves by roughly 1.4-million bbl. of oil equivalent and raise its daily production to more than 500 bbl. and 2.4-billion cu. ft. of gas a day with its recent acquisition of GKM, Inc., and its subsidiary, Twin Eagle Petroleum Corp. With the acquisition, Petromark operates about 600 wells in nine states, mainly in Texas, Oklahoma and Kansas. The GKM transaction is the Petromark's third acquisition in two years.

Charter Reports First Half Earnings

Charter Co., which operates Charter Oil Co., reported net earnings of $4-million in the second quarter of 1987 vs. $40-million in the like period of last year.

For the half, Charter said earnings were $5.9-million vs. $29.4-million in 1986. Extraordinary income and tax loss benefits accounted for much of the 1986 earnings. The company earlier this year extricated itself from Chapter 11 bankruptcy so the third quarter will be its first in the open since the spring of 1985.

Staten Island Terminal Changes Hands—Again

The old Chevron/Gulf terminal on Staten Island, N.Y., has still another new owner, this one little more than a month after the facility changed hands in July. Oxbow Corp., New York, a big blender-trader, purchased the terminal from Petroport, a subsidiary of Southville Oil, Long Island, which had previously bought it from Chevron for $12-million.

The terminal has about 88 storage tanks on 500 acres. Oxbow was quoted as saying it will use the terminal for public storage because it's "more economical to be a warehouser than a renter."

Industry Study Shows Improved Air Quality

An API study indicates that air quality in most U.S. metropolitan areas which are facing possible federal pollution penalties is considerably better than generally perceived. The study evaluates government data on ozone pollution in 25 major urban areas during the period from 1981 to 1985 and concludes that most of them were in compliance with ozone ambient air quality standards more than 99% of the monitored hours.

Consumer Survey, Continued . . .

view, meet those tests."

Thomas reiterated that Amoco has a major stake in alternative fuels, including coal and oil shale, and stated flatly: ". . .we have no vested interest in discouraging the use of ethanol or any other competitive fuel. However, as a participant in an extremely competitive business, we are concerned about economics and our customers. Amoco believes that government should not single out one alternative fuel for special subsidization or support. Technology and economics should be relied upon to identify the transportation fuels that can become the most viable alternatives to gasoline."

Trade Groups File Motion In State Ozone Case

Five petroleum industry associations—API, Sigma, NACS, PMAA and SSDA—filed a joint motion to intervene in a lawsuit initiated by the Conservation Law Foundation of New England, Inc. last March against the state of Massachusetts, state officials and the U.S. Environmental Protection Agency.

The suit takes issue with Massachusetts' implementations of federal ozone standards and with EPA's alleged lack of enforcement. And it claims there are contingency measures in the state plan which the state should carry out, among which is Stage II vapor recovery equipment at service station pumps. The suit also charges the state should stop issuing permits for construction of stationary sources of volatile organic compound emissions. This would be a construction ban.

An API spokesperson described the joint motion of the trade groups to intervene in this case as an opportunity, if granted, to argue against any court order resulting in mandatory Stage II regulations for Massachusetts and to argue against a state construction ban. With the motion now pending, API has learned that the Conservation Law Foundation told the court they will not oppose the groups' motion to intervene as long as they do not delay the case and as long as they limit the arguments to only the two issues in their motion. "We feel the outcome of this case could impact other non-attainment states that don't have Stage II," the API spokesperson said.

The Conservation Law Foundation could not be reached for comment.

Another group representing 2,800 Massachusetts manufacturers filed its own motion to intervene on June 8 and the court granted the motion on June 30. The Associated Industries of Massachusetts (AIM) represents petroleum companies with storage facilities, solvent users, solvent manufacturers and motor vehicle manufacturers among others in the state.

AIM argues that the current state implementation is acceptable and that any arguments to the contrary are due to Massachusetts receiving ozones from surrounding states where Federal regulations are not as stringent. AIM adds that it wants a chance to comment if the courts rule that tighter implementation guidelines need to be put into effect in Massachusetts.

"We do wholeheartedly welcome the filing for intervention by API and the other organizations," said G. Montgomery Lovejoy III, director of AIM's Energy and Environment Program.

"Our number one goal is to protect the integrity of the state implementation plan," Lovejoy said. "We would share API's concerns about non-cost effective controls placed on the petroleum industry."

Moody's Reviews Williams Companies

Moody's Investors Service has recently placed the securities ratings for the Williams Companies and its subsidiaries, Northwest Pipeline Corp. and Williams Natural Gas Co., under review for a possible upgrade.

The review was prompted by the announcement that Williams will sell three million shares of common stock and that the net proceeds from the sale will be used to reduce bank debt.

The rating agency will determine whether Williams' credit quality and financial flexibility will be improved with the sale of common stock.

Texaco Legal Fees Total $55-million

Prodded by a disgruntled stockholder, Texaco has admitted that legal fees in its running battle with Pennzoil Corp., have topped $55-million in the last 20 months. Pennzoil won a historic $10-billion plus verdict in a Texas Court in December 1985 because Texaco allegedly interfered in Pennzoil's purchase of the old Getty Oil Co. a year earlier. Texaco is now in Chapter 11 bankruptcy.

The $55-million represents retainers and fees for law firms and investment bankers. In addition, Texaco also must pay investment bankers who are advising its creditor committees. One of these is asking $125,000 monthly and the other $200,000 monthly. One of the law firms received an initial retainer of $1-million to get involved in the Texaco case.

Pennzoil has never indicated how much the legal costs have been in its fight with Texaco. There's no doubt it runs into the millions. The only question is how many.

In a separate matter, Texaco was sued by Exxon Corp. in late August in U.S. District Court in Houston for $123.6-million. Exxon claims this is Texaco's share of a $2.1-billion judgment it was forced to pay the U.S. government for allegedly overcharging customers for crude oil from the East Texas Hawkins Field, of which it was the operator.

A Texaco spokesman was quoted as saying that "we have a very strong case and will defend our position vigorously."

Virginia "Superstore" Adds Postal Box Unit

In addition to gasoline, groceries and deli food items, customers at the new 5,400 sq.ft. "superstore" recently opened by Fas Mart Convenience Stores, Inc. can also pick up their mail—at any time of day or night.

The design of the new store included sufficient space to contain a detached postal box unit for the Ashland, Va., area, near Richmond. The new facility is said to be the first "marriage" between a C-store and the U.S. Postal Service in Virginia. The union provides a much needed local postal unit for the Postal Service and increases daily customer traffic at the store, according to a Fas Mart spokesperson.

The leased postal section contains almost 600 letter boxes of various sizes and 20 parcel post boxes. A customer leasing a box has access to the facility 24 hours per day. Plans to add more postal customer services are being developed.

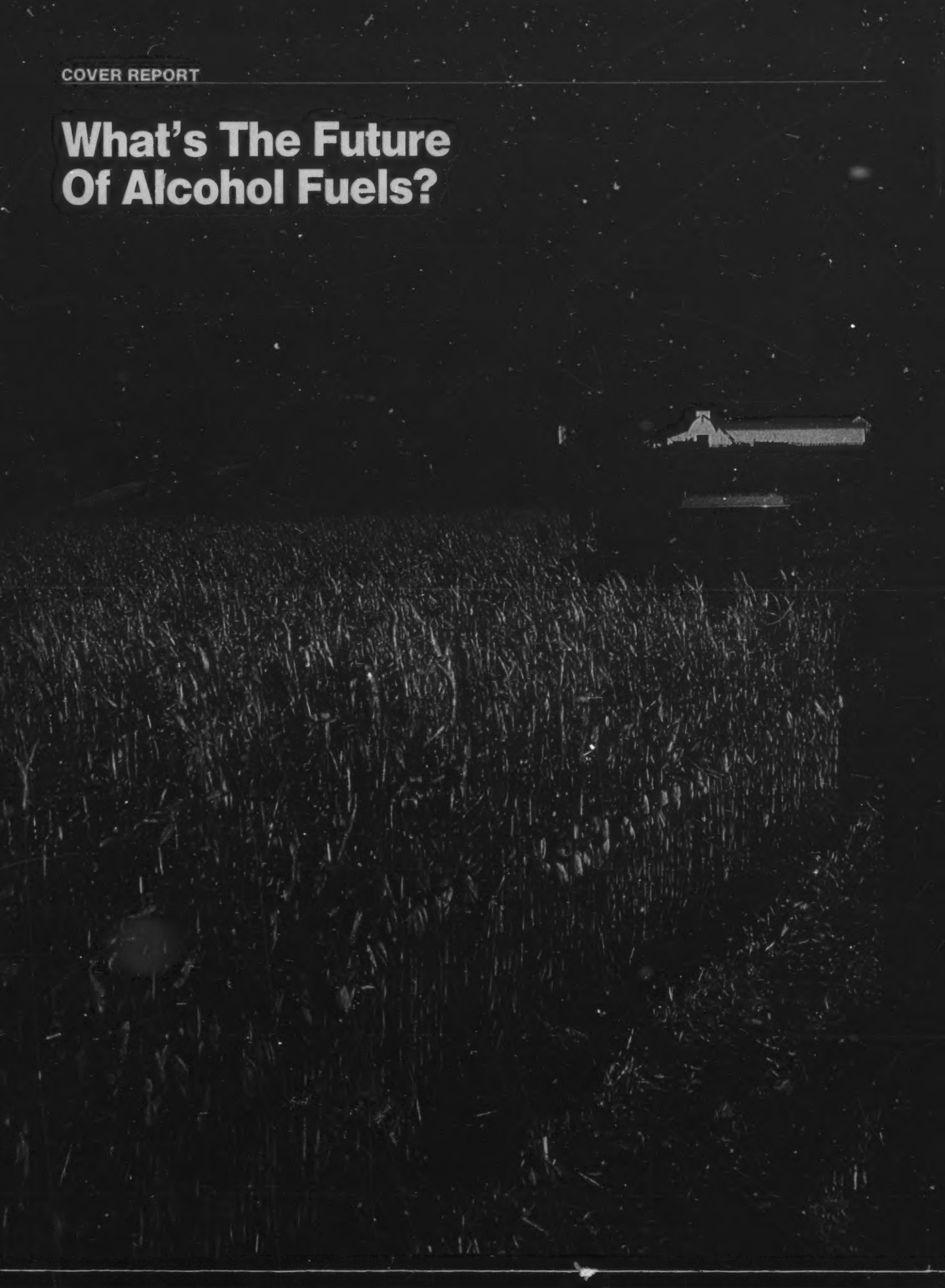
A close-by commercial/industrial park provides a strong customer base for C-store and postal business.

Also featured in the company's giant new store is a community meeting room which is offered to non-profit community-oriented organizations at no charge during evenings and weekends. It also doubles as an in-house corporate training room during the day.

Fas Mart, headquartered in Mechanicsville, Va., operates 19 C-store/gasoline outlets in Virginia, plus four pumper/kiosk facilities. Five additional C-store plus fuel outlets are currently under construction. The new outlets will average about 3,600 sq.ft. of store space and have sit-down deli food service.

The company markets Amoco, Citgo and some Chevron branded gasoline.

What's The Future Of Alcohol Fuels?



Blessed with a new array of raisons d'etre and endowed with a more positive image, good old-fashioned "gasohol" is in the midst of a contentious struggle in the motor fuel marketplaces to improve itself and its future; or, at the least, to hang on to what it's got.

There seems to be no question that alcohol fuels are going to be an increasingly controversial topic this year and next, especially on the national scene as office seekers and politicians hulk it for its obvious voter appeal and federal regulators move in from different directions.

Gasoline marketers are anything but unanimous in their attitudes on alcohol fuels, with many independents proclaiming their virtues, others questioning them and many majors in outright opposition or obliquely looking down their noses at the product.

Federal and state tax exemptions, farm subsidies, national security and air pollution control strategies are going to be the principal bones of contention.

In an industry badly divided over the advantages and disadvantages of alcohol fuels, octane numbers and pump margins also are going to generate differences of opinion as the furor over oxygenated fuels and vapor pressures grow stronger.

Many majors dislike alcohol fuels because of quality control problems in blending, product stability at retail pumps and price disadvantages in the premium grades between branded and unbranded volumes. The independents generally love the margin edges and equalizing octane numbers they can get by blending their own gasolines.

All this adds up to controversy—even question marks for alcohol fuels in the short-term future if tax subsidies continue to erode.

Business Booming?

The alcohol people say business is booming with at least one major manufacturer claiming that 1986 not only was the best year ever but that their own statistics are conservative and don't tell the whole story—yet.

The manufacturers anticipate further growth in alcohol fuels consumption in 1987, probably aggregating 8.14-billion gal. by the end of the year. That would be an increase of about 150-million gal. over 1986.

Controversy grows over taxes, terms and sales volumes

On the other hand, the Federal Highway Administration, which also collects and publishes gasohol data, doesn't share that optimism. Its data indicate that gasohol consumption peaked in 1985, declined in 1986 and, based on estimates for the first four months of 1987, may be in for further erosion this year, possibly as much as 5%. That would be a decrease of about 350-million to 400-million gal. below 1986 on its chart.

The gap between the two sets of figures projected by for 1987 is big—at least 500-million gal. and possibly as much as three-quarters of a billion gal. (See related chart on Page 41).

The alcohol industry data through the years has been consistently higher than the FHA numbers but so long as both were on the upward trail, little attention was paid to the disparities. Last year, the consumption totals diverged with the industry numbers on the plus side and the FHA totals slightly under the 1985 high. The differences, while not overwhelmingly disturbing, are enough to create puzzlement, however, over whether consumption of alcohol fuels is going up, down or merely standing still.

The problem obviously is in the data collection processes.

The industry statisticians use some of the FHA information and collect additional data through company sales reports, personal contacts with state officials and estimates for states which normally do not separate alcohol fuels from regular fuels tax summaries. This, they say, gives them more complete information than the government has.

FHA's gasohol reports basically come from the states as part of their regular reporting procedures. They concede that in some states where the tax on gasoline and gasohol are the same that some gasohol may be commingled with gasoline volumes. FHA analysts also note that some states are not geared up to separate the products. They feel, however, the gasohol volumes are "insignificant."

The alcohol manufacturers and the federal people do not see eye-to-eye on the product itself, either.

"Gasohol was a product of the late '70s," says a manufacturer. "It was pretty well an orthodox mix of 90% regular gasoline and 10% alcohol, generally, ethanol. Its original objectives were to extend motor fuel supplies which then were on the thin side and to impact on pump prices which were well over the $1 gal. range.

"What we're talking about now," he says, "is ethanol-blended unleaded gasoline and/or alcohol-enhanced unleaded gasoline—usually in the mid and premium grades. In plain and simple words, the nomenclature is alcohol fuels, not gasohol. There's a world of difference in the products and in the marketplaces too. Gasohol just isn't meaningful any more as a product classification."

FHA and some other government agencies continue to call the motor fuel "gasohol," however, and show no signs of backing away from that designation. So

The relatively short-life span of alcohol fuels has seen product emphasis shift from insurance against shortages to octane enhancement, air quality improvement and farm surplus reduction.

does the American Petroleum Institute, the Petroleum Marketers Assn. of America, the Society of Independent Gasoline Marketers and other associations.

National Issues

Be that as it may, the marketplaces and the raisons d'être for ethanol-blends, methanol blends and other alternatives like MTBE are different now and more varied in their significance.

Where once the key consideration was the hamburger-helper idea of expanding basic supplies in a time of shortages, now there's a new array of reasons ranging from octane enhancement, better street economics, national security, air pollution control concepts and farm surplusses.

They are heating up as national issues with at least a half-dozen major bills in the congressional hoppers now, and such presidential aspirants as Vice President George Bush, Sen. Robert Dole (R-Kan.) and others endorsing the idea that alcohol-laced fuels will help agricultural and national interests by using up crop excesses, reducing farm-subsidy payments and simultaneously curtailing U.S. dependence on foreign oil. All of those items have special voter oomph in farm states and among environmentalists and those concerned about growing dependence on foreign oil, especially from the Middle East.

The Environmental Protection Agency also is in the forefront by extolling alcohol fuels as a palliative for atmospheric pollution problems in some areas, even though they raise Reid vapor pressure, which contributes to air problems. The fact that EPA is supporting the idea of alcohol fuels into the indefinite future is a sanguine sign for the hybrid industry.

Colorado has already taken a big step in moving to control carbon monoxide levels by mandating the using of alcohol fuels in the winter months, effective this coming Jan. 1. The state's Air Quality Control Commission estimates that with both ethanol and methyl tertiary butyl ether (commonly known as MTBE) in the marketplaces the new law will reduce ambient carbon monoxide levels by 14%. At the outset only the nine-county Denver area is affected but the supposition is that market patterns will over-run parts of Wyoming, Nebraska and South Dakota as well. How well the program goes will be watched closely by other regulators for possible emulation.

California also is another front-runner on methanol motor fuels. The basic difference between ethanol and methanol fuels is the quantity of gasoline in use. In ethanol, the blend is generally 90% unleaded gasoline and 10% alcohol; in methanol, generally 15% gasoline and 85% methanol. California has cut a deal with Arco and may do likewise with Chevron to operate a number of methanol stations to further test the product [*NPN*—Aug.'87, p18]. The big point is that because of California's traditional pioneering in air pollution strategies, this concept can be expected to infiltrate other states over the next 10 years or so. Some

Illinois Leads States as No.1 Consumer of 'Gasohol'

Illinois motorists, who use more than 1-billion gal. of gasohol yearly, are the nation's top consumers of ethanol-laced gasoline.

However, over the past six years, Iowa has been No. 1 twice, Michigan once, Indiana once and Illinois twice.

Here are the rankings of the top five in recent years, according to Federal Highway Administration data:

State/Year	(Bil. gal.)
1986	
Illinois	1,286,828
Ohio	814,579
Kentucky	736,349
Indiana	668,638
Virginia	426,552
1985	
Illinois	1,065,454
Indiana	696,137
Ohio	691,669
Florida	581,364
Kentucky	556,478
1984	
Indiana	587,396
Michigan	577,723
Illinois	562,036
Florida	508,751
Ohio	495,595
1983	
Michigan	565,991
Indiana	525,076
Iowa	510,208
Ohio	489,292
California	480,850
1982	
Iowa	498,836
California	464,004
Illinois	251,200
Michigan	206,794
Oklahoma	155,053
1981	
Iowa	190,358
California	147,795
Michigan	65,530
Florida	60,357
Illinois	51,331

Source: Federal Highway Administration, Monthly Consumption Reports.

'Gasohol is a product of the late 70s.'

industry people think methanol may be the fuel that eventually replaces gasoline as the fuel of mobility after 2000.

Among the plusses for methanol: It's a home-grown product that can be made from natural gas, coal and biomass; thus supply sources are almost unlimited, totally domestic and far removed from any dependence on foreign oil. Among the minuses: Car engines have to be modified, product storage is a hazardous problem, and utilized energy is only about half that of gasoline. In other words, two gallons of methanol are needed to equal one gallon of gasoline. But then what marketer wouldn't like to double his volume just to take care of the customers he has now?

Tax Subsidies

A key problem for alcohol fuels and the federal-state governments is the question of subsidies. It is generally agreed that subsidies made it possible for gasohol and alcohol fuels to enter the gasoline markets in the first place and to prosper through the 1980s to date. There is no real disagreement that without subsidies, alcohol fuels can not survive. They would wind up costing more at the retail pumps than conventional motor fuels and with surplusses of gasoline all over the place, there would be no economic way for them to hang on.

The federal subsidy is 6¢ a gal. Originally scheduled to die in 1992, its life has been extended beyond the year 2000. Unofficial estimates indicate that the subsidies cost the federal goverment about $440-million in 1985 alone. On a straight-line projection, this could mean that these subsidies would approximate $6.6-billion through 1999.

State subsidies have varied. At the moment, New Mexico is the highest with exemptions of 11¢ state and 6¢ federal for a total of 17¢ gal.(see related tax table on Page 49). Some states are reducing or eliminating the special exemptions for alcohol fuels, however. At the present time, fewer than a score of states are still continuing the practice—down about a third from the peak period.

These subsidies are what make the big differences in the marketplaces, however. One big independent in the Southeast, for example, says ethanol blending not only gives him a competitive octane number for his mid-grade and premium fuels but also an edge of 3¢ to 5¢ gal. at the pump vis à vis his branded opponents. Archer Daniels Midland, the nation's biggest producer of ethanol, cites studies which show how a Kansas jobber blended pool gasoline and boosted his 6¢ gal. margin to 13¢ gal. [*NPN*—Feb. '87, p28]. There are any number of independents who can cite similar gains.

One of the big stumbling blocks that slowed the growth pattern of alcohol fuels last year and some support of subsidies was the collapse of crude oil prices in late 1985 and early 1986. Sharp declines in street prices for regular gasolines coupled with some increases in alcohol costs simply erased competitive values.

"What you have to do is look at these subsidies in a positive, not negative, manner," an alcohol manufacturer spokesman says. Crude prices are higher, he says, and product prices have risen too—not much but nevertheless upward. "But we are not even considering the hundreds of millions of dolllars we are spending on the warships and the planes and the servicemen on special duty in the Persian Gulf protecting the oil supply lines. Subsidies at both federal and state levels are peanuts compared to those costs."

Some gasoline marketers complain, however, that alcohol suppliers have also sharply increased their prices. A Tennessee marketer says he is now paying $1.60 gal. for ethanol, double his price of a few months ago. "There is no way the alcohol manufacturers can justify a price hike of 80¢ gal.," he says, adding that such price increases coupled with the loss of state tax subsidies quickly wipes out the competitive advantages of alcohol fuels.

Political Concerns

The ethanol industry won what amounted to a landmark victory several months ago when the National Conference of Weights and Measures (NCWM) overwhelmingly adopted a regulation permitting 10% ethanol blends a waiver from ASTM volatility limits so long as the base gasoline meets

Seasonal Comparisons Show Minimal Change in Octanes

Unless there were significant changes this past summer, which was not very likely based on early reports from the marketplaces, the octane numbers of the basic grades of gasoline have been remarkably steady in the face of the stiffening competition for gallonage.

The National Institute for Petroleum and Energy Research, Bartlesville, Okla., noted in its most recent survey that the octane numbers for unleaded regular, unleaded premium and leaded regular were substantially unchanged in the tests made last winter vis a vis the comparable period of 1985-86.

About the only thing of importance in the gasoline/octane world—a factor which the prosaic research report will not catch up with for probably another year of two—was the relatively recent introduction of the unleaded midgrades by many companies in regional and national marketplaces and the accelerating trend toward an all-unleaded economy.

Otherwise, about the only discernible trend has been a slow growth in the octane quality of unleaded gasoline above 90.0. This has increased a half-octane number in the four year period of 1983-84 to 1986-87. Bear in mind, however, that these are only averages for random samples. Many majors and independents alike are marketing premium-grade unleadeds in the 92.0 range, and some, like Sun, guarantee a basic 93.5 grade. It is axiomatic, therefore, that in order to maintain these high averages, some companies are pumping gasolines as high as 95 to 99 octane into the distribution systems.

The survey is made semi-annually by the Institute under contract with the federal government and the API. The most recent one covered the winter of 1976-77 and was published in late June.

Here's a bird's eye view of the key findings:

	Winter 1985-86 (All R+M/2)	Winter 1986-87 (All R+M/2)
Unleaded Below 90.0	87.3	87.2
Unleaded Above 90.0	91.8	91.8
Leaded Below 93.0	88.8	88.7
Unleaded Gasohol Below 90.0	88.4	88.7
Unleaded Gasohol Above 90.0	90.0	91.2
Leaded Gasohol Below 93.0	90.0	90.1

N.B. It should be noted that the samples tested in the gasohol survey were far fewer in number than the total involved in the conventional gasolines.

'Gasohol' Consumption by States—1981/1986

(millions of gal.)

State	1981	1982	1983	1984	1985	1986
Alabama	—	11,521	29,637	34,899	196,111	261,286
Alaska	—	—	—	—	—	—
Arizona	1,843	5,096	772	—	—	—
Arkansas	6,104	8,462	12,631	28,871	9,913	—
California	147,795	464,004	480,850	401,837	288,017	189,046
Colorado	9,200	23,990	56,562	82,233	273,553	70,463
Connecticut	9,495	4,461	1,476	5,421	16,409	5,323
Delaware	20	—	—	—	—	—
Dist. of Col.	20	34	52	84	22	205
Florida	60,357	103,053	357,232	508,751	581,364	315,527
Georgia	3,851	148	158	18	—	—
Hawaii	1,411	368	—	—	—	—
Idaho	—	2,464	8,747	8,067	21,167	22,016
Illinois	51,331	251,200	240,000	562,036	1,085,454	1,286,828
Indiana	—	120,559	525,076	587,396	696,137	668,638
Iowa	190,358	498,636	510,206	457,125	436,164	385,130
Kansas	14,100	7,448	67,396	273,077	281,617	232,604
Kentucky	2,507	18,872	100,646	328,238	556,478	736,349
Louisiana	—	—	—	24,424	123,597	336,187
Maine	1,287	—	—	—	—	—
Maryland	7,754	107	74	82	720	501
Massachusetts	4,517	290	56	—	—	—
Michigan	65,530	206,794	565,991	577,723	548,885	382,010
Minnesota	3,200	4,653	3,578	2,707	350,169	374,032
Mississippi	—	—	—	—	—	—
Missouri	—	—	6,996	13,860	18,756	—
Montana	473	10,170	11,326	10,181	8,079	3,454
Nebraska	31,072	89,698	183,345	208,455	242,367	216,356
Nevada	641	964	283	—	1,142	18,650
New Hampshire	1,149	—	—	—	—	—
New Jersey	1,680	—	—	—	—	—
New Mexico	—	1,082	26,589	63,756	75,502	58,752
New York	—	—	—	—	—	—
North Carolina	13,174	7,456	2,912	34,037	121,220	—
North Dakota	11,003	6,499	4,400	5,469	36,680	65,327
Ohio	9,632	91,679	489,292	495,595	691,669	814,579
Oklahoma	37,499	155,053	75,704	23,620	25,374	26,994
Oregon	—	2,073	1,370	298	168	—
Pennsylvania	—	—	—	—	—	—
Rhode Island	399	22	—	—	—	—
South Carolina	14,518	59,688	1,018	154	700	15,550
South Dakota	6,733	13,808	31,947	41,343	52,402	63,484
Tennessee	—	—	—	264,167	365,020	394,469
Texas	—	38,142	282,091	207,152	429,495	362,243
Utah	—	500	—	26,358	6,223	2,409
Vermont	—	—	—	—	—	—
Virginia	1,991	30,834	46,213	131,618	349,930	426,552
Washington	9,982	7,230	7,943	9,143	7,574	26,797
West Virginia	134	—	—	—	—	—
Wisconsin	—	2,718	1,046	1,962	15,069	15,312
Wyoming	846	259	202	309	281	55
Total U.S.	722,606	1,998,845	4,133,857	5,420,466	7,817,418	7,781,128

Source: Federal Highway Administration, Monthly Consumption Reports and Information Resources, Inc., internal reports.

ASTM specifications. ASTM is the national standards group whose findings are generally picked up by the state fire marshalls and regulatory bodies and implemented on local levels. This is the first time that the NCWM has endorsed adoption of EPA exemptions and standards for ethanol-blended fuels.

The NCWM resolution was strongly supported by the Renewable Fuels Assn. and a broad coalition of refiners, farm groups, independent gasoline marketers and others. It was vigorously opposed by American Petroleum Institute, Exxon, Amoco, Shell, Marathon, Chrysler, General Motors and others.

In Congress, there are at least a half-dozen pro-ethanol-type bills awaiting consideration. These call for the mandating use of alcohol fuels in the future starting with as little as 1% of ethanol in 1988 and arriving generally at 10% in the early 1990s; at least one also proposes up to 5% methanol by 1988.

API, PMAA and other groups take somewhat neutral positions on such proposals. Their basic objection is to the "mandate" aspect of determining the composition of fuels. That, they say, should be up to the marketplaces themselves to determine.

More proposals are expected this fall and early next year.

The federal agencies, including EPA, Department of Energy and the Department of Agriculture, also are involved both in studies and recommendations affecting alcohol fuels. One to keep an eye on is a DOE study of the costs and benefits of alternative fuels in the transportation system. It is taking in such considerations as cost-effectiveness and national security. It's scheduled for release sometime next summer. Another study of significance involves a questionnaire sent out by DOE's Office of Alcohol Fuels to suppliers and marketers soliciting information on corporate practices and personal attitudes about alcohol fuels and government policies about promoting them. Two USDA efforts currently include a reappraisal of a 1986 study which concluded that subsidies were more beneficial to farmers than ethanol tax breaks—a finding that produced strong alcohol industry protests—and a feasibility study on possible establishment of a Strategic Ethanol Reserve. The report is expected out soon.

The whole concept of alcohol fuels is fraught with controversy and significance. For many marketers, just keeping up with

In its heyday in the late 70s, "home grown" gasohol was as much a national political issue as it was another street blend, a situation that set the stage for extensive tax breaks.

Regional Octane Numbers, Winter 1986-87

Two winters ago, the surveyors added alcohol-enchanced gasolines to their semi-annual reports. The gasohol reports are on the sketchy side, however, inasmuch as only 150 or so samples are tested nationally versus the 1,500 or so samples of conventional grades. The gasohol numbers are included in the regional report which follows:

(All grades are R + M/2)*

	[Conventional Gasolines]			[Alcohol Gasolines]		
	Unleaded		Leaded	Unleaded		Leaded
Regions	Below 90.0	Above 90.0	Below 93.0	Below 90.0	Above 90.0	Below 93.0
Northeast	87.4	92.3	89.3	NS	NS	NS
Mid-Atlantic	87.3	92.2	89.2	89.9	92.3	91.2
Southeast	87.4	92.1	89.2	NS	91.3	91.1
Appalachian	87.3	92.3	89.2	88.4	90.6	90.9
Michigan	87.0	92.2	89.1	87.1	90.2	89.0
N. Illinois	87.2	91.7	89.3	88.2	90.9	89.5
Cent. Miss.	87.2	91.4	89.2	87.9	92.6	90.0
Lower Miss.	87.2	91.7	89.1	88.7	91.9	91.2
North Plains	87.2	92.0	88.4	NS	NS	88.6
Cent. Plains	87.1	91.0	88.3	88.6	90.7	90.3
South Plains	87.5	91.7	88.7	NS	90.0	91.2
South Texas	87.4	91.9	89.2	NS	NS	NS
S. Mt. States	86.9	91.5	87.7	87.7	90.4	88.2
N. Mt. States	86.0	91.2	86.9	88.9	90.6	NS
Pac. N'west	87.2	91.9	88.1	NS	NS	NS
N. Calif.	87.8	92.0	88.3	88.6	92.4	89.4
S. Calif.	87.7	92.0	88.3	NS	NS	NS
U.S. averages (winter seasons)						
1986-87	87.2	91.8	88.7	88.4	91.2	90.1
1985-86	87.3	91.8	88.8	88.4	91.6	90.0
1984-85	87.4	91.6	89.1	NA	NA	NA
1983-84	87.3	91.3	88.8	NA	NA	NA

NS = No samples; NA = not available.

* Federal formula for combining research and motor method numbers and dividing the total by two to obtain a common denominator for octanes.

Source: Motor Gasolines, Winter 1986-87, National Institute for Petroleum and Energy Research, Bartlesville, Okla.,

Constraints will limit market applications

developments or understanding what they're all about are difficult agenda items. One report that will help them is an exceptional study by PMAA this past summer. Entitled "Alcohol Fuels: Environmental Impacts, Economics and Policy Implications," it provides good backgrounding as well as reciting pros and cons of key issues.

One conclusion it reaches:

"Ethanol and methanol are both potential contributors to our nation's energy supplies. Each fuel deserves continued attention in terms of research and development, both for improvement of existing technology as well as for solving outstanding technical problems.

"Different constraints will limit wider market applications for ethanol and methanol in the near future. It is doubtful, however, that large government subsidy programs are the most effective means of achieving broad commercialization of alternative transportation fuels." NPN

Conflicting Data On Blended Fuel

Although both sides have plausible reasons why the other is probably in error, there are substantial gaps in the ethanol-blend consumption data compiled by the alcohol industry and the federal government—something like three-quarters of a billion gal. right now.

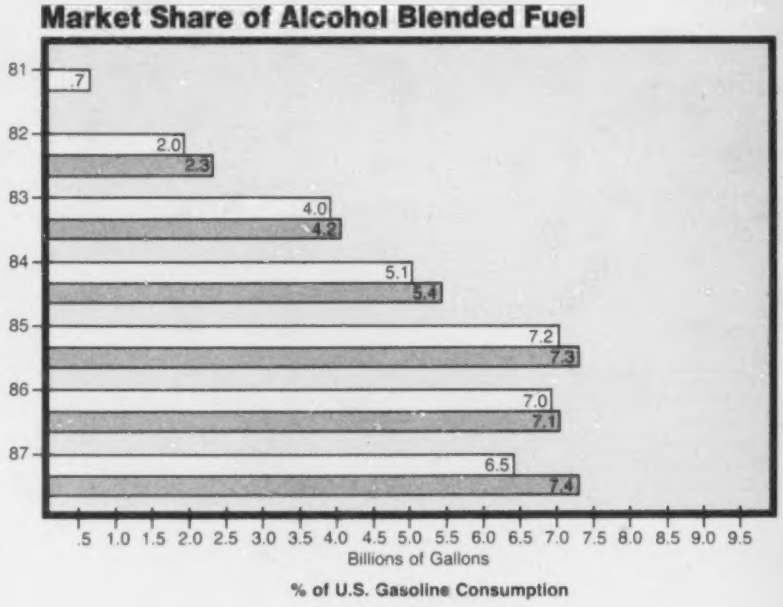
The alcohol data, compiled by Information Resources, Inc., of Washington, D.C., indicates that ethanol-blended gasoline consumption has been climbing steadily since the early '80s. In 1986, this group says, consumption exceeded 7.99-billion gal., and projections for 1987 indicate it'll top 8.14-billion gal. by Dec. 31.

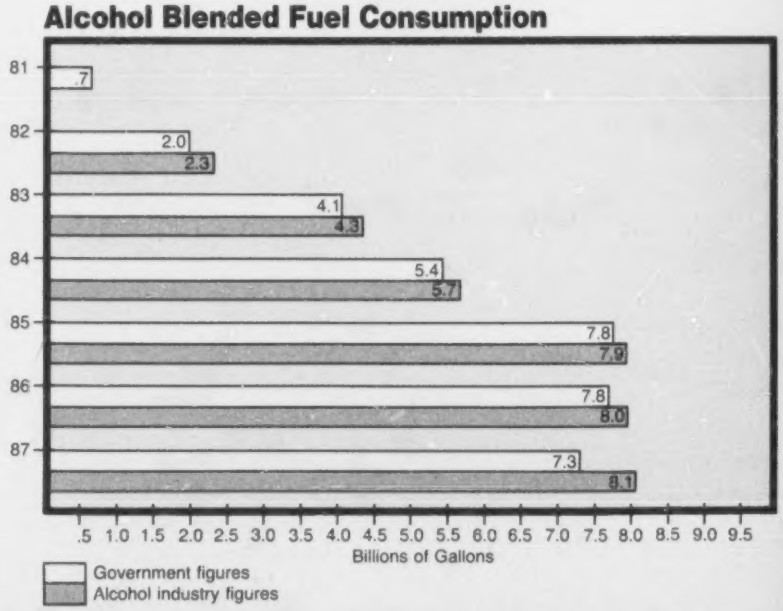
On the other hand, data collected by Federal Highway Administration, says 'gasohol' consumption peaked at 7.81-billion gal. in 1985, slipped to 7.78-billion gal. in 1986, and—based on preliminary reports and estimates for the first four months of this year—seems to be headed for a level around 7.36-billion gal., also by Dec. 31.

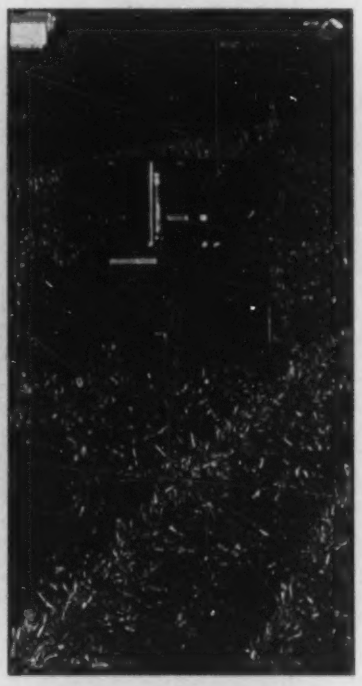
Alcohol industry people enthusiastically support the Information Resources data, claiming that it collects consumption data that the FHA reports miss entirely. FHA concedes that some ethanol-blended gasoline may be commingled at times with conventional gasoline data and that some states are not geared up to report "insignificant" volumes, but that its numbers are basically sound and supportable.

The two are far apart on semantics, too. Alcohol industry people say 'gasohol' is a 1979 word that doesn't mean anything any more; that the appropriate designation is ethanol-blended gasoline. The FHA and other government agencies still use 'gasohol' regularly.

Here's an over-all view of the conflicting numbers:







Gasohol's Tax Breaks: From 6¢ to 17¢ gal.

Not all states grant special benefits to gasohol but since the federal government is across the board with a minimum of 6¢ gal., there is just no way to escape it. State and federal benefits range up to 17¢ gal. in New Mexico. All told, 20 states give gasohol a helping hand. In 1985, these tax exemptions cost the states $219-million in lost revenues and the federal government another $440-million, for a grand total of $659-million in that year alone.

The federal exemption had been scheduled to expire in 1991 but recently was extended to 1992. There's at least one bill in Congress now to extend the exemption beyond the year 2000. If the federal exemption continues through 2000 on the same rule-of-thumb costs that prevailed in 1985, the revenue losses by that time will have exceeded $6-billion. State losses would be in the neighborhood of $3-billion.

Here's a state-by-state rundown of gasoline taxes and ethanol-enhanced fuel exemptions in effect July 1, 1987 and the cost in revenues to the states in 1985:

State	Fed/State Gasoline Taxes (7/1/87) (¢ per gal.)	Fed/State Gasohol Exemption (7/1/87) (¢ per gal.)	State Revenues Lost in 1985 (Mil. $)
Ala.	22	9 (a)	$5.88
Alas.	17	14	—
Ariz.	25	6	0.94
Ark.	22.5	6	—
Calif.	18.0	6 (b)	—
Colo.	27	6	11.91
Conn.	26	7	0.16
Del.	22	6	—
D. of C.	24.5	6	—
Fla.	18.7	8	17.98
Ga.	16.5	6	—
Haw.	20	6	—
Ida.	23.5	10	0.85
Ill.	22	6	—
Ind.	23	6	—
Ia.	25	7	6.49
Kans.	20	9	12.63
Ky.	24	6	19.48
La.	25	6 (c)	19.78
Me.	23	9	—
Md.	22.5	6	0.22
Mass.	20	6	—
Mich.	24	6	13.58
Minn.	26	8	13.15
Miss.	18	6	—
Mo.	16	6	—
Mont.	26	6 (d)	0.36
Neb.	28	9	9.67
Nev.	22	7	—
N.H.	23	6	—
N.J.	17	14 (a)	—
N.M.	20	17 (a)	8.31
N.Y.	17	6	—
N.C.	24.5	6	5.98
N.D.	22	14	2.4
Oh.	21	6 (d)	17.17
Okla.	19	6	—
Ore.	21	6	—
Penna.	21	6	—
R.I.	24	6	—
S.C.	22	12	—
S.D.	22	8	1.73
Tenn.	26	10	11.8
Tex.	24	10	10.85
Utah	28	6	—
Vt.	22	6	—
Va.	26.5	6 (e)	27.99
Wash.	27	7.8 (a)	0.14
W.Va.	19.5	6	—
Wis.	27	6	—
Wyo.	17	6	—
Totals			
State	—	—	$219.45
Federal	—	—	$440.00
Fed/State	—	—	$659.45

(a) Exemption applies only to alcohol produced within the state.
(b) Excise tax on ethanol or methanol fuels containing not more than 15% gasoline is one-half the use fuel tax rate from 1/1/82 to 1/1/89.
(c) In Louisiana, gasohol exemption was repealed 9/1/86 and replaced with a producer's incentive credit of $1.40 gal. of ethanol.
(d) A dealer is refunded 25¢ gal. for ethanol and methanol blended with unleaded gasoline.
(e) In Virginia, exemption was repealed 7/1/86 and replaced with a producer's incentive credit of 60¢ gal. of ethanol.

What the Future May Hold For Gasoline Composition

Gasoline marketers take the heat if motorists are unhappy with the gasoline they buy, but the government, refiners, auto makers and others make the decisions on what kind of product it will be.

It should come as some consolation to marketers that gasoline composition, which has been up in the air for two decades, seems finally to be settling down.

As a sign of the growing calm, most refiners have stopped predicting gasoline shortages and other dire calamities as a result of new requirements being forced upon them by regulators and auto makers. Refiners are finding octanes they didn't seem to know they would have.

With all of the changes that have taken place, a research firm has undertaken to evaluate motor fuel composition and forecast what it is likely to be to the year 2000.

The industry-funded project by Southwest Research Institute (SwRI), San Antonio, Texas, began in April 1987 and will be completed in April 1988.

SwRI has reported some preliminary conclusions about fuel-composition trends.

Emerging Grades

With the lead phasedown scheduled to be essentially completed at the start of 1988, three unleaded grades have emerged: regular unleaded (RU), middle unleaded (MU), and premium unleaded (PU). A very-low-lead regular (RL) may remain in the picture for a while, depending on federal policy.

There has been a burst of PU sales the past year as gasoline prices have come tumbling down and motorists have increasingly tried something better than the standard 87-oct. RU. With nothing in between, motorists had no choice but to buy PU, usually 92 oct.

As the marketing of 89-oct. MU spreads, many motorists are finding that product adequate to eliminate engine knocking in most circumstances, and cheaper than PU.

SwRI expects the surge of PU sales to fade. Speaking at the SIGMA convention in San Diego earlier this year, Brent K. Bailey, SwRI senior research engineer and project manager, said:

"There's been a tremendous increase in the use of unleaded premium in the past six to nine months. We believe this is going to be a short-lived thing.

"Unfortunately, this is a high-margin product and many of you are benefiting from that, but as the price of gasoline rises, we believe that the unleaded midgrade will assume some of this market demand.

"Right now, the vehicles that are out there have an option: either to use an 87-oct. unleaded or go to what is generally a 92-oct. unleaded product. If their cars have an octane appetite of say 88 or 89, they have no choice but to go to 92. With the emergence of the unleaded midgrade, we think this will suck off some of unleaded premium demand we're seeing right now."

Presto: More Octanes

When the U.S. EPA ordered a lead phasedown in 1985, scheduled to be accomplished in 1988, many refiners said it would create an octane crisis. There would be gasoline shortages, some said, and some refineries would not survive the transition.

This hasn't happened.

In 1970 the clear (unleaded) octane pool in the United States was 84.6 numbers, reports SwRI. This dropped to 84.1 oct. in 1975. It has increased since then, to 86.0 in 1980 and 87.2 in 1985, and is projected to rise to 88.1 in 1990.

Says Bailey, "The refiners have been pleasantly surprised the past year that they've been able to meet this kind of octane demand already without much in terms of capital investment, just by adjusting their processing conditions and their blending techniques. They already have what we're projecting as the octane demand for 1990.

"Less than a year ago, many refiners were very concerned about where they were going to get all the octanes. Much of that problem has been solved. Looking at the grade splits we have now, there seems to be enough octane. There are some refiners, however, who are still scraping to get enough octane to meet their demand."

Some of the factors contributing to lower octane demand than had been anticipated are: lead banking [*NPN*—April '86, p12], fewer vehicles requiring leaded gasoline, a decrease in the octane quality of RU and the use of an unleaded midgrade that captured some PU sales.

Bailey says, too, there's been "less octane giveaway in recent years," meaning refiners and blenders are not making, and marketers are not selling, as much gasoline of higher octane than motorists need.

He says additional octane relief would result if MMT, a manganese antiknock compound, could be used to replace lead in certain circumstances, which he termed a possibility. He reports, "MMT is a major blending component in Canada, in both leaded and unleaded gasolines."

Enter Detergents

Detergents seem to have solved the problem of clogging port fuel injectors, but may be causing other problems, SwRI reports.

"The biggest change in gasoline composition, which has occurred just this past year," says Bailey, "is the addition of detergents across the board in gasoline. It's indeterminate what the outcome is going to be.

"It appears the port-fuel-injection problem has been solved by the addition of these detergents. However, some of the deposits are forming downstream on the valves. The deposits have shifted from the injectors to the input manifold and into the valves, and there's a possibility these deposits could be forming in the combustion chambers. Those could have a drastic effect on the octane appetites of the vehicles.

"As the deposits build up in the combustion chamber, the octane appetite also grows because of the compression-ratio increase. The deposits in the combustion chambers can also form hot spots that cause knock."

Bailey says this problem will have to be watched closely to see if detergents are increasing octane requirements. Octane requirements are studied annually by a joint interindustry group.

Grade Ratios

One of the most important questions for gasoline marketers is the future grade ratio: that is, the proportion that will be sold of each grade. A ratio of 1:1:1 means sales are divided equally among all three grades, whatever they may be. Ratios are, of course, approximate and are calculated by *NPN*.

Station layout and island configurations are determined to a large extent on the basis of expected grade sales ratios.

The ratio in 1995, based on SwRI projections, will be 6:1:1 (RU:MU:PU). This means the amount of RU sold is expected to be approximately six times the amount sold of either of the other two grades. In other words, an eight-pump station should theoretically have six pumps of RU and one each of MU and PU.

The accompanying graph shows the actual U.S. grade sales percentages for 1980 and 1985, and the projected ones for

1990 and 1995. Note that PL disappears between 1980 and 1985, and MU appears and RL disappears between 1985 and 1990.

Grade ratios are based on the sales percentages shown in the graph. The grade ratio in 1990 would be 3:1:1 (RU:MU:PU). The ratio in 1985 was 2:3:1 (RL:RU:PU). The ratio in 1980 was a complicated 10:7:1:2 (RL:RU:PL:PU).

Health Concerns

EPA is by no means finished regulating gasoline composition, and probably the biggest unknowns hanging over gasoline are what EPA will decide to do.

Because of the need for more octanes, aromatic content of gasoline has increased markedly since the early 1970s—from 22% in 1970 to 35% today and rising. Bailey reports EPA is studying whether aromatics are carcinogenic. If some are banned, octanes would have to be obtained some other way.

Further octane reduction would occur if the amount of butane, one of the highest-octane blending components, has to be decreased. Butane is highly volatile, meaning it evaporates easily into the atmosphere. The volatility of gasoline has been increasing steadily, in both winter and summer. EPA is considering limiting the volatility of gasoline in the summer, in which case some or all butane would probably have to go.

With gasoline volatility steadily rising, Bailey believes EPA will limit volatility to 9 lb. (Reid vapor pressure) in the summer across the board.

This is the current requirement in southern California and effectively bans the use of ethanol from May to September. Unless EPA grants ethanol a waiver, gasohol, which is a mixture of one part ethanol and 9 parts gasoline, will have to go.

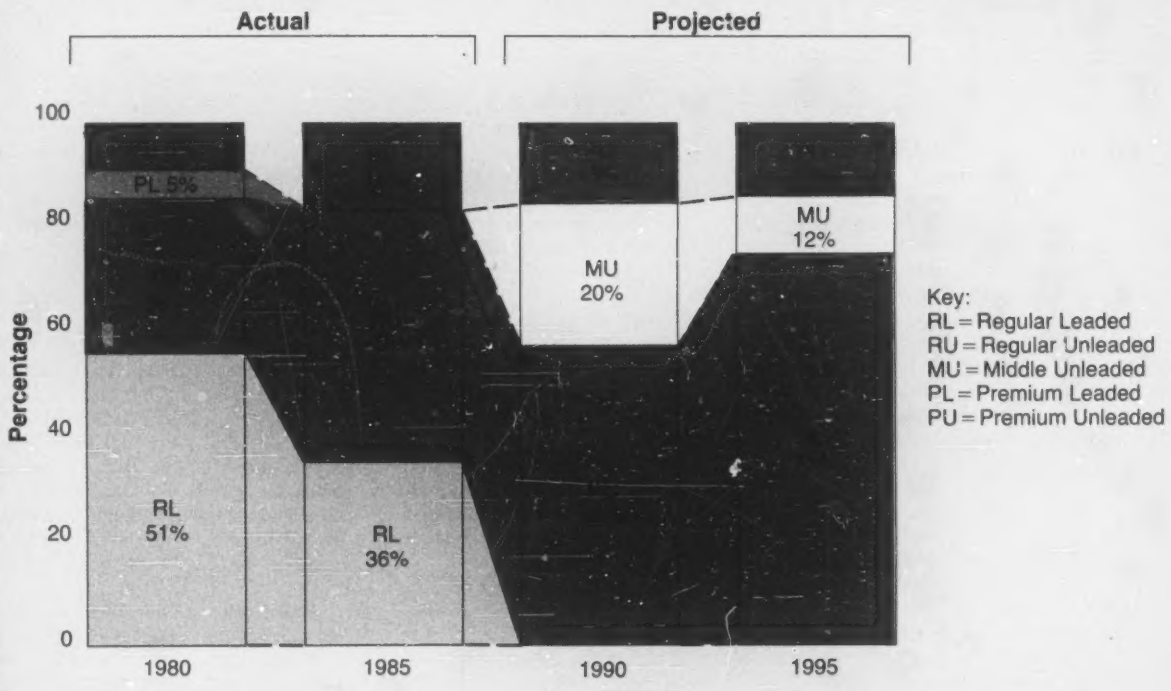
Methanol: Fuel Of Tomorrow?

Bailey says the question of using methanol widely as a motor fuel in this country is not simply like that of the chicken and the egg: the chicken being the vehicle that can run on neat of near-neat methanol fuel, and the egg being the distribution system to make the fuel available.

Another problem is methanol capacity, he says. "Right now the total methanol capacity in the U.S. represents about 1% of the total gasoline demand, and the vast majority of this methanol has already been earmarked for use in chemical markets. So there's only a small fraction of methanol available."

He concludes, "We don't see methanol coming into substantial use as a replacement for gasoline until certainly after the end of this century. All three of the major car manufacturers agree that methanol is the best alternative at this time, but this will not come about until the economics of methanol production improve, or until some kind of political mandate causes methanol to replace gasoline." NPN

U.S. Gasoline Sales Percentages by Grades, 1980-1995



Source: Southwest Research Institute, San Antonio, TX.

OSHA Benzene Ruling Heats Up Bulk Storage Issues

For the beleaguered bulk plant owner, the jury is still out on the cost of OSHA's new benzene regulations.

On Sept. 1, the Occupational Safety and Health Administration issued "a new standard to reduce the permissible worker exposure level in all industries where benzene is used from 10 parts per million parts of air (10 ppm) to 1 ppm averaged over an eight-hour workday. The final benzene standard will become effective 90 days after the September publication in the Federal Register," cites a release from OSHA.

"The colorless, highly flammable liquid used widely as a solvent in the chemical, printing, rubber and petroleum industries is the culprit—with 95 of every 1,000 workers who face daily exposure to benzene on the job under the current standards likely to develop leukemia," OSHA has estimated.

In addition to reducing the permissible exposure level, provisions of the standard cover methods of compliance, personal protective equipment, employee monitoring, medical surveillance, medical removal protection, communication of hazard information to employees, regulated areas and recordkeeping.

(Copies of the new standard can be obtained by sending a self-addressed mailing label to the closest OSHA Regional Office listed in phone directories under the U.S. Department of Labor, or to the OSHA publications office, Room N3101, 200 Constitution Ave., NW, Washington, D. C. 20210.)

Overview

The OSHA Office of Public Information plans to offer a "simplified booklet," to help clarify the lengthy document, and the following is an initial overview from an OSHA spokesman as it pertains to bulk plant owners:

Bottom line: Bulk wholesale storage facilities which already have installed vapor recovery equipment are exempt from the benzene standard. However, if they do not have it, owners must take an initial measurement of the benzene levels.

—If exposures are below .5 parts per million, (ppm), then no further action is required.

—If exposures are between .5 ppm and 1.0 ppm, then the employer has two options: He can reduce exposures to below .5 ppm (which according to OSHA could probably be accomplished through a revision of work practices). Or, if the employer does not wish to do that, he can provide "medical surveillance," for his employees, which includes an annual physical with a complete blood count and remonitoring once a year.

—If exposures are over 1.0 ppm, the employer must reduce employee exposure to under 1 ppm.

—If exposures are over 1.0 ppm only for maintenance workers, the employer could use respirators, says OSHA. This, of course, would not apply to production operations where personnel would continually be loading and unloading product.

All of the above, OSHA maintains, could be attempted before resorting to vapor recovery to reach the acceptable limits.

OSHA's experts maintain that improved work practices and good housekeeping could solve many borderline problems. According to OSHA, it's "conceivable," that some owners might have to install vapor recovery, but not that many would be affected.

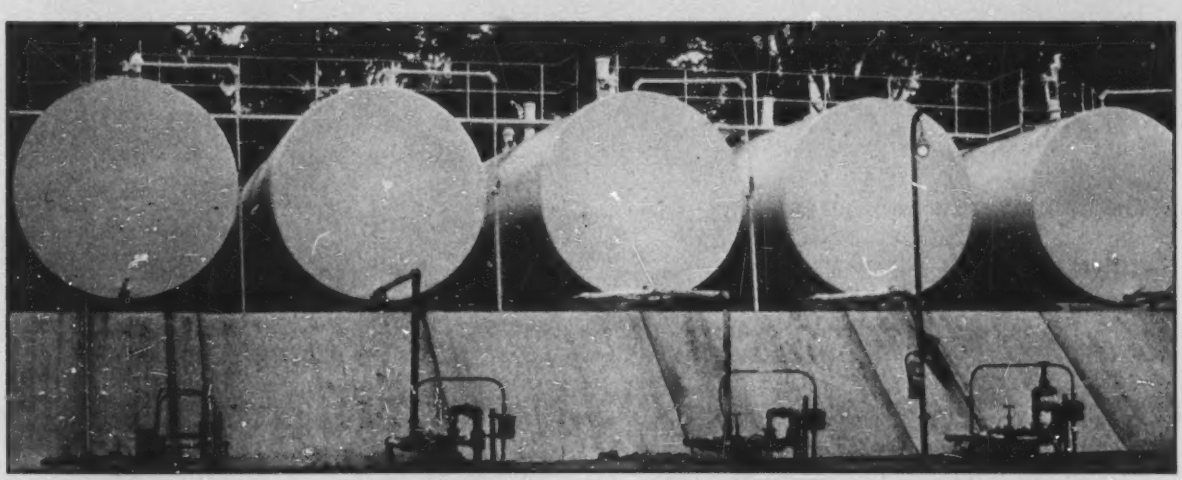
There's good news for everyone involved in the storage, transportation, sale, dispensing and use of gasoline after it leaves a bulk plant. OSHA has exempted just about all facilities from the bulk tanks out in its proposed regs. The agency found that benzene exposures in retail service stations, for example, were well below its proposed "action level" of 1.0 ppm.

Reasons cited included the facts that service station dispensing work is outdoors, that most gasoline nowadays is pumped by motorists at self-serve islands rather than attendants, and that the retail sector is characterized by a largely "transient" work force, making it difficult to implement requirements for medical surveillance and training.

Reactions

Phil Chisholm, executive vice president, Petroleum Marketers Assn. of America (PMAA), says it remains to be seen how many of the nation's estimated 15,000 bulk plant operations will be affected—especially the smaller rural owners.

"It is another nail in the coffin," he says, "but whether it's the final nail for some of the smaller owners remains in



Bulk plant operators who do not have vapor recovery equipment could face sizeable expenditures as the new OSHA benzene regs go into effect. However, they'll have more than two years to install any required "engineering controls," OSHA says.

SUMMARY OF ESTIMATED TOTAL ANNUALIZED NONENGINEERING COSTS ASSOCIATED WITH THE REVISED STANDARD
(1983 DOLLARS)

	Provision						
Industry	Regulated Area	Exposure Monitoring	Compliance Program	Respirator Use	Training	Medical Examination	Total Annual Costs
Petrochemicals	7,500	255,000	4,500	153,000	0*	117,700	538,200
Refining	11,800	279,400	7,100	414,000	0*	1,211,800	1,924,100
Coke and Coal chemicals	2,100	62,900	1,200	130,500	0*	56,500	253,200
Bulk Terminals	11,500	377,400	28,700	91,800	0*	52,100	561,500
Bulk Plants	65,200	2,325,000	163,300	521,800	951,800	830,900	4,858,000
Trucks	N/R	51,600	7,800	N/R	281,300	122,200	462,900
Tire	N/R	N/R	N/R	N/R	N/R	209,900	209,900
Total	**98,100**	**3,351,500**	**212,600**	**1,311,400**	**1,233,100**	**2,601,100**	**8,807,800**

Source: U.S. Department of Labor, OSHA, Office of Regulatory Analysis.
*OSHA assumed to be in compliance.
N/R = OSHA assumes that these provisions are not required.

question. When everyone, including myself, has had a chance to review the final regs to determine exactly what's going to be required, each and every individual bulk plant operator is going to have to determine what's needed for their particular operation."

Chisholm feels there are a still lot of unanswered questions. "Despite the clear exemption of above ground storage facilities currently using vapor recovery, there are many rural facilities serving agricultural areas and small service stations where vapor recovery has never been required and never been implemented."

A bulk plant consulting engineer, John Storb, P.E., president of Storb, Inc. in Pennsylvania, estimates that a new vapor recovery unit alone could cost $150,000. If you add in the costs for the minimum three-arm installation, a small rural plant could end up paying a total of $250,000.

According to OSHA sources, bulk storage facilities needing "installation of engineering controls" (which could include vapor recovery) will have 27 months to comply after the date of publication of the proposed regs, which is Friday, Sept. 11.

"I guess it's not all bad news," says Chisholm. "OSHA appears to have constructed a good compromise by creating alternatives to vapor recovery such as monitoring procedures and modifications of work programs, and medical monitoring for employees. . .but who's going to pay those additional costs?"

An OSHA spokesman says that monitoring equipment required for this procedure, (described in the Federal Register), is very expensive and since the smaller tank owners can rarely afford this outlay, it will probably be more economical for them to get an industrial hygienist or a certified lab technician to initially make the test as OSHA did while assembling the regulations.

An OSHA contractor estimated that the yearly cost of maintaining the standard (includes monitoring equipment service, medical costs, etc.), would run an average of $450 per facility.

As an additional cost-cutting measure, the OSHA spokesman suggested that interested owners check with their individual states for consultant services which may be under contract to the federal government and who may be able to do the initial monitoring without charge.

Cutting Losses

This newest rulemaking appears to be just one more chapter in the "never-ending battle" that continues to plague bulk plant owners. This includes volatile gasoline pricing, safety and pollution insurance issues as well as proper maintenance.

Wayne Hughes, general marketing manager for Federated Insurance, sees "loss prevention" as the key to cutting industry costs:

"There doesn't seem to be a lot of new

ESTIMATED TOTAL ANNUALIZED COSTS ASSOCIATED WITH THE REVISED BENZENE STANDARD
(MILLIONS OF 1983 DOLLARS)

Sector	Total Annualized Engineering Costs	Total Annualized Nonengineering Costs	Total Annualized Costs
Petrochemical	5.1	0.5	5.6
Petroleum Refining	2.1	1.9	4.0
Coke and Coal Chemical	6.8	0.3	7.1
Tire Manufacturers	1.0	0.2	1.2
Bulk Terminals	0.2	0.6	0.8
Bulk Plants	N/A	4.9	4.9
Tank Truck	N/A	0.5	0.5
Total All Sectors	**15.3**	**8.8**	**24.1**

Source: U.S. Department of Labor, OSHA, Office of Regulatory Analysis.
N/A = Not Applicable (i.e., OSHA assumed that compliance with these provisions will not be required).

'I guess it's not all bad news,' says PMAA's Chisholm

OSHA came up with a good compromise by creating alternatives to vapor recovery, an industry spokesman says.

above ground tank insurers coming into the market anymore, but those that are already present seem relatively comfortable with regular liability exposure. We insure about 8,000 petroleum marketers nationally—both those with above ground and below ground tanks.

"Pollution liability exposure is still very volatile. However, policies are available covering such issues as overspill and leaks.

"We continue to have some losses in the explosion area. Again, it seems that safety and loss control are paramount for any petroleum marketer who's interested in minimizing his chances of loss.

"Here's a few things we are currently recommending to people with above ground storage tanks: Older tanks should be lined. If they aren't, you'll pay more premiums. We also think that tanks should be on concrete saddles, because although rust and corrosion can still occur, we think the loss can be discovered sooner. In short, following the safety codes for the National Fire Protection Assn. (NFPA 30) make the tank owner's liability more affordable and more available.

"As part of its loss-prevention program, Federated offers its customers a very useful booklet designed to simplify the NFPA 30 codes for easy compliance," says Hughes. It covers such crucial safety features as loading racks, bonding and grounding, pumping and piping systems, venting and drainage and diking.

The installation of impervious diking, though necessary to meet regulations, places yet another burden on the tank owners budget: Rick Romero, vice president and field equipment engineer for J-8 Equipment Co., sees it as "replacing one potential problem with another potential problem. The impervious dike was, of course, designed to protect the groundwater. But if you have a spill, the dike now becomes an open tank with the potential for any spark to create a dangerous fire. It's a tradeoff, at best."

Looking at the economics of tank ownership in today's market, Phil Chisholm observes, "I think what small tank owners have got to do is find themselves an economic niche that only their bulk plant can serve. It might be the agricultural community, it might be small load, it might be heating oil accounts, but it has to be an area that can't be served by anyone else.

"Of course," he says, "for those in a speculative mood, there's always going to be the time when they wish they had a bulk plant. Let's face it, everyone would love the luxury of storing it away and having it on hand when the market goes up. A lot of people used to play that game in the past, but sadly, they don't need terminal facilities to do that anymore.

ESTIMATED ECONOMIC IMPACTS OF THE BENZENE STANDARD ON AN AVERAGE FIRM IN EACH INDUSTRY SECTOR

Industry	After-Tax Profit Decline of an Average Firm in Each Industry If Revenues Are Unchanged (Percent)	Increased Revenues Required to Offset Fully the Compliance Costs of an Average Firm in Each Industry (Percent)
Petrochemical	1.84	0.07
Petroleum Refining and Bulk Terminals	0.04	<0.01
Iron and Steel	0.24	0.02
Tire Manufacturers	0.31	0.01
Bulk Plants	0.61	<0.01
For-Hire Tank Trucks	0.46	0.01

Source: U.S. Department of Labor, OSHA, Office of Regulatory Analysis.